National Park Service
U.S. Department of the Interior

Hantavirus Risk Reduction

Worker Protection

Updated December 2013

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National Park Service
Office of Public Health
Washington, DC
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This report received formal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data, and whose background and expertise put them on par technically and scientifically with the authors of the information.

Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

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Introduction

This document summarizes the updated recommendations from the Centers for Disease Control and Prevention (CDC) for hantavirus risk reduction for workers. The information is adapted from the Morbidity and Mortality Weekly Report, July 26, 2002; Vol. 51; No. RR09.

Precautions

Precautions for Workers Frequently Exposed to Rodents

Persons who frequently handle or are exposed to wild rodents are probably at higher risk for hantavirus infection than the general public because of the frequency of their exposures. Such persons include, but are not limited to: wildlife specialists; maintenance workers; employees involved in rodent management; concessions managers; some custodial staff; and building and fire inspectors. Therefore, enhanced precautions are warranted to protect them against hantavirus infection, as described below.

- Workers in potentially high-risk settings should be informed by their employers about hantavirus transmission and symptoms of infection, and be given detailed guidance and training on prevention measures. Determining the level of risk for HPS in each work setting is the responsibility of the park. The Regional Public Health Consultant and Safety Officer may be contacted for assistance, if necessary.

- Workers who develop a febrile or respiratory illness within 7 weeks of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of hantavirus infection.

- When removing rodents from traps, handling rodents, or cleaning heavily infested areas, workers should wear either a NIOSH-approved half-face or full-face, tight-seal, negative-pressure respirator or a positive pressure PAPR (powered air-purifying respirator), both options must be equipped with P-100 or N-100 filters. Employees must be in compliance with NPS Director’s Order #50B and Reference Manual #50B for respiratory protection. Requirements include medical clearance and annual training and fit testing for each approved respirator type. Any individual wearing a respirator must be clean shaven.

- Workers should wear rubber, latex, vinyl, or nitrile gloves when cleaning or working in rodent infested areas, handling rodents or handling traps containing rodents. Before removing the gloves, wash gloved hands in a disinfectant or chlorine solution and then wash bare hands in soap and water.

- Mammalogists or wildlife biologists who handle wild rodents for research or management purposes should refer to the published safety guidelines available on CDC's website, All About Hantavirus (http://www.cdc.gov/ncidod/dvrd/spb/mnpages/rodentmanual.htm).

Precautions for Workers Having Potential Contact with Rodents

Persons who work in occupations with unpredictable or incidental contact with rodents or their nesting sites should follow general risk reduction recommendations and seek guidance from their safety manager or the Office of Public Health. Examples of such occupations include: archaeologists; natural resource specialists; utility operators; curators; and certain construction workers. Workers in these jobs may have to enter buildings and crawl spaces, or might otherwise be exposed to sites or materials that are potentially rodent-infested. Recommendations for such circumstances must be made on a case-by-case basis after the specific working environment has been assessed. The Regional Public Health Consultant or the Safety Officer may be consulted as needed to assist in the assessment. Determining the level of risk present and implementing appropriate protective measures is the responsibility of the park.

Areas with evidence of rodent activity (e.g., dead rodents, nests, and droppings) should be thoroughly cleaned to reduce the likelihood of exposure to hantavirus-infected materials. Cleanup procedures must be performed in a manner that limits the potential for dirt or dust from contaminated surfaces to become airborne. Recommendations are listed in this report for cleaning up (1) rodent urine and droppings, and surfaces potentially contaminated by rodents; and (2) dead rodents and rodent nests.

Cleanup

Cleanup of Rodent Urine, Droppings, and Contaminated Surfaces

- During cleaning, wear rubber, latex, vinyl, or nitrile gloves.
- Spray rodent urine and droppings with an EPA registered disinfectant or chlorine solution until thoroughly soaked. (See Cleanup of Dead Rodents and Rodent Nests below.) Allow disinfectant-soaked area to sit for at least 10 minutes before proceeding.
- To avoid generating potentially infectious aerosols, do not sweep rodent urine, droppings, or contaminated surfaces until they have been disinfected (soaked with disinfectant for at least 10 minutes).
- Use a paper towel to absorb the urine and disinfectant and pick up the droppings. Place the paper towel in the garbage.
- After the rodent droppings and urine have been removed, disinfect items and underlying surfaces that might have been contaminated by rodents or their urine and droppings.
    - Mop floors with a disinfectant or chlorine solution. Allow to sit for 10 minutes before rinsing.

- o Disinfect countertops, cabinets, drawers, and other durable surfaces with a disinfectant or chlorine solution. Allow disinfectant to sit on surface for 10 minutes before wiping down.
- o Spray dirt floors with a disinfectant or chlorine solution.
- o Disinfect carpets with a disinfectant or with a commercial-grade steam cleaner or shampoo.
- o Steam-clean or shampoo rugs and upholstered furniture.
- o Launder potentially contaminated bedding and clothing with hot water and detergent. Use rubber, latex, vinyl, or nitrile gloves when handling contaminated laundry. Machine-dry laundry on a high setting or hang it to air dry in the sun.
- o Leave books, papers, and other items that cannot be cleaned with a liquid disinfectant or thrown away, outdoors in the sunlight for several hours, or in an indoor area free of rodents for approximately 3 weeks before cleanup. After that time, the virus should no longer be infectious. However, to further reduce risk, wear rubber, latex, vinyl, or nitrile gloves and wipe the items with a cloth moistened with disinfectant.
- o Before removing the gloves, wash gloved hands in a disinfectant or chlorine solution and then wash bare hands in soap and water.

Cleanup of Dead Rodents and Rodent Nests

- Wear rubber, latex, vinyl, or nitrile gloves.
- In the western United States, use insect repellent (containing DEET) on clothing, socks, and arms to reduce the risk of fleabites that might transmit plague, tularemia, or other diseases.
- Spray dead rodents and rodent nests with a disinfectant or a 10% chlorine solution, soaking them thoroughly. Wait 10 minutes before disturbing to ensure inactivation of the virus.
- Place the dead rodent or nest in a plastic bag, or remove the dead rodent from the trap and place it in a plastic bag. When cleanup is complete (or when the bag is full), seal the bag, place it into a second plastic bag, and seal the second bag. Dispose of the material in the double bag discarding it in a covered trash can that is regularly emptied.
- Clean up the surrounding area and area that was underneath the rodent as described in "Cleanup of Rodent Urine and Droppings and Contaminated Surfaces."

Disinfecting Solutions

Two types of disinfecting solutions are recommended to clean up rodent materials.

1. General-Purpose Household Disinfectant: These can be used for light infestations (ie, rodent droppings present, evidence of chewing, but no extensive nesting or droppings). Prepare according to the label, if not prediluted. Almost any agent commercially available in the United States is sufficient as long as the label states that it is a "disinfectant" and it has an EPA registration number on the label. Effective agents include those based on phenols, quaternary ammonium compounds, and hypochlorite solutions at a 1:100 or greater concentration.

2. Hypochlorite Solution: A 10% chlorine solution, freshly prepared by mixing 1½ cups of household bleach in 1 gallon of water (or a 1:10 solution) can be used in place of a commercial disinfectant and should be used for heavily infested areas (ie, several rodent nests with extensive droppings present). When using chlorine solution, avoid spilling the mixture on clothing or other items that might be damaged by bleach. Wear rubber, latex, vinyl, or nitrile gloves when preparing and using chlorine solutions. Chlorine solutions should be prepared fresh daily.

Cleaning Shed and Other Buildings

Before cleaning closed sheds and other outbuildings, ventilate the building by opening doors and windows for at least 30 minutes. Use cross ventilation if possible. Be sure that you do not stir up any dust when entering to open windows and leave the area during the airing-out period. This airing helps to remove infectious primary aerosols that might be created by hantavirus-infected rodents. In substantially dirty or dusty environments, additional protective clothing or equipment may be worn. Such equipment includes coveralls (disposable when possible) and safety glasses or goggles, in addition to rubber, latex, vinyl, or nitrile gloves. For recommendations regarding precautions for cleanup of outbuildings with heavy rodent infestations, see below.

Recommendations for Cleaning Homes or Buildings with Heavy Rodent Infestations

Special precautions are indicated for cleaning homes or buildings with heavy rodent infestations. A rodent infestation is considered heavy if piles of feces or numerous nests or dead rodents are observed. Persons cleaning these homes or buildings should contact their Safety Officer or Public Health Consultant. These precautions also can apply to vacant dwellings that have attracted rodents while unoccupied and to dwellings and other structures that have been occupied by persons with

confirmed hantavirus infection. Workers who are either hired specifically to perform the cleanup or asked to do so as part of their work activities should receive a thorough orientation about hantavirus transmission and disease symptoms and should be trained to perform the required activities safely.

- If the building has been closed and unoccupied for a long period (weeks or months), ventilate the building by opening doors and windows for at least 30 minutes before beginning any work. The ventilation helps to remove aerosolized virus inside the structure. Use cross ventilation if possible. Leave the area during the airing-out period.

- Persons involved in the cleanup should wear coveralls (disposable, if possible); rubber boots or disposable shoe covers; rubber, latex, vinyl, or nitrile gloves; protective goggles; and a respirator with appropriate clearance, annual fit-testing, and approvals as detailed in "Precautions for Workers Frequently Exposed to Rodents."

- Personal protective gear should be decontaminated or safely disposed of upon removal at the end of the day. If the coveralls are not disposable, they should be laundered on site. If no laundry facilities are available, the coveralls should be immersed in liquid disinfectant until they can be washed.

- Wash hands thoroughly after personal protective equipment is removed.

- Unless burned on site, all potentially infectious waste material from cleanup operations should be double-bagged in durable plastic bags and then discarded in a covered trash can that is regularly emptied. Contact the local or state health department concerning other appropriate disposal methods.

- Persons involved in the cleanup who develop a febrile or respiratory illness within seven weeks of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of hantavirus infection.

Special Considerations for Historic Structures or Structures with Dirt Floors

- Consult cultural resources staff before beginning any work in historic structures.

- Some disinfectants, such a 10% or greater bleach solutions or repeat use of other disinfectants, can change the color of an organic surface (such as wood, cloth, etc). If this is a concern for a historic structure, disinfectants such as household disinfectants or isopropyl/ethyl alcohol might be more appropriate.

- Dirt floors should be treated as other hard surfaces, with extra care taken not to stir up dust. Thoroughly wet the area and adjacent area with disinfectant, allow the disinfectant to sit for at least 10 minutes, and use a wetted paper towel to clean up the droppings or material.

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The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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